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NEW SPECIES OF NORTH AMERICAN *HYDROPORUS, NIGER-TENEBROSUS* GROUP (COLEOPTERA: DYTISCIDAE)

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The information presented here is part of a doctoral dissertation entitled "A revision of the *niger-tenebrosus* group of *Hydroporus* (Coleoptera: Dytiscidae)," completed in 1969. As with many such theses, the likelihood of seeing it published in the entirety becomes more remote as time goes by. Therefore I welcome the opportunity to publish at least the most critical portion as a tribute to Hugh Leech.

When I was an enthusiastic collector of water beetles as a student at North Dakota State University, Hugh Leech was one of my idols. I was positively impressed with the quality of his published work and can still recall the sort of trepidation with which I composed my first letter to him. Better still, I can recall the thrill of receiving his prompt reply, and being amazed at the length of it. I can now well appreciate the amount of time he must have spent in responding to an unknown amateur. That was the first of many such letters over the years, and no matter what my questions were, or what specimens I might send or request, or what literature I might need, the response from Hugh Leech was always the same: prompt, complete, and unfailingly encouraging. Several years have passed since then, and I am, hopefully, slightly further along as a taxonomist, but Hugh remains a very special person to me. Rarely is one privileged to work contemporaneously in the same research area with a person as universally respected as Hugh, and I am grateful to have had the opportunity. I dedicate this paper to him, for without his encouragement and help, it might never have been initiated.

Fall (1923) wrote the first revision of the *niger-tenebrosus* group which is the only complete treatment of that group. Much of the difficulty encountered by Fall in separating species still exists; examination of male genitalia has alleviated the problems somewhat, but the group remains probably the most difficult among all of the North American Dytiscidae. The *niger-tenebrosus* group is one of 4 groups proposed by Fall (1923) for North American members of the genus *Hydroporus* Clairville. Sharp (1882), in his monograph on the Dytiscidae of the world, split *Hydroporus* into 8 groups, and Fall modified Sharp's system for the North American species. The other 3 groups of North American *Hydroporus* are: the *pulcher-undulatus* group,

oblitus group, and *vilis* group. Members of the *niger-tenebrosus* group are nearctic, palearctic, or holarctic in distribution. Most New World species are found in Canada and the northern United States with a few species ranging south to Florida, Texas, and Arizona. One species is reported from northern Mexico.

Larson (1975) published an excellent work on the Dytiscidae of Alberta, in which he dealt with those species of the *niger-tenebrosus* group occurring in that province. Larson described 3 new species, *H. hockingi, H. criniticoxis* and *H. carri.*

Type-material included herein has been deposited with the following institutions or individuals (abbreviations listed are used in the text): California Academy of Sciences (CAS); Frank Young, Indiana University (FNY); J. R. Zimmermann, New Mexico State University (JRZ); Museum of Comparative Zoology, Harvard University (MCZ); Robert Gordon (RDG); North Carolina State University (NCS); Ohio University (OU); Field Museum of Natural History (FM); Cornell University (CU); American Museum of Natural History (AMNH); University of Idaho (UID); U.S. National Museum of Natural History (USNM). The number of paratypes examined from each locality is listed in front of each new locality.

Hydroporus boreus, new species
(Figs. 1, 2)

Holotype male.—Length 4.85 mm, width 2.10 mm. Form obovate, widest posteriad to middle of elytra (Fig. 1). Head yellowish rufous with faint traces of two triangular spots between the eyes; palpus and undersurface of head yellowish rufous; antenna yellowish rufous, last four segments dark apically. Pronotum yellowish rufous. Elytron light brown. Undersurface and legs yellowish rufous.

Head alutaceous; punctures fine, separated by twice their diameter.

Pronotum faintly alutaceous; fine punctures on disc separated by twice their diameter, punctures becoming nearly contiguous laterally and posteriorly; equal in width to base of elytra; hind angle recurved; lateral margin narrow, slightly wider than an anterior protarsal claw; pubescence fine, almost lacking.

Elytron with alutaceous sculpture nearly absent, strongly shining; coarsely and densely punctured, punctures much larger than pronotal punctures, separated by less than their diameter; pubescence fine and sparse; lateral margin ascending in basal third.

Metasternal wing and plate and first two abdominal sterna with large coarse punctures. Metacoxal process truncate at apex. Pro- and mesotarsi narrowly dilated, three-fourths as wide as tibia, basal segment largest, second and third segments progressively smaller. Protarsal claws equal, ante-

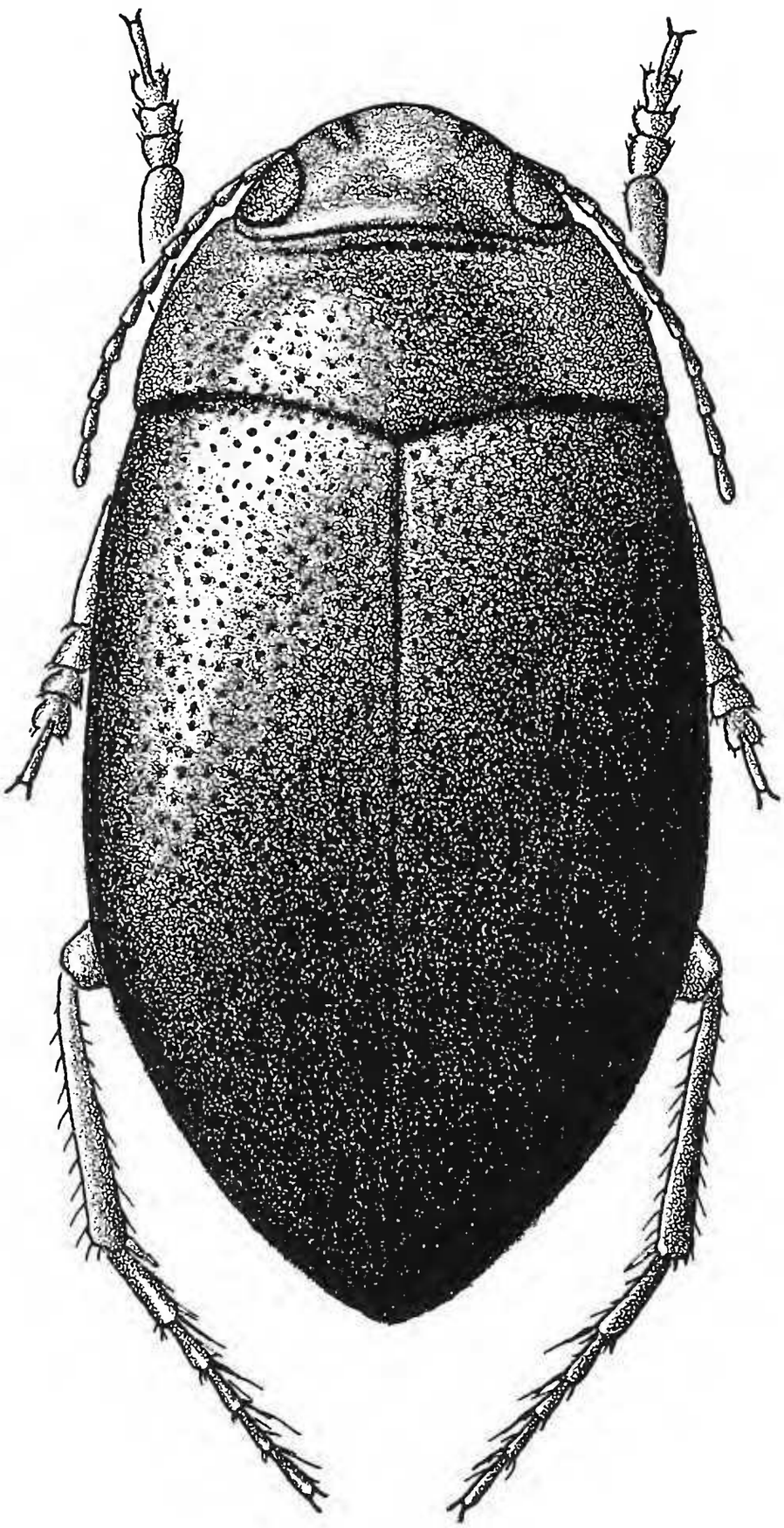

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Fig. 1. Habitus. *Hydroporus boreus*, n. sp.

rior claw just perceptibly thicker, claws half the length of last tarsal segment. Aedeagus tapered from base to apex, the tip curved downward (Fig. 2).

Allotype.—Length 4.00 mm, width 1.90 mm. Similar to holotype except dorsal surface dull, elytron definitely alutaceous with punctures much smaller than male. Pro- and mesotarsi dot dilated; protarsal claw simple.

Variation.—Length varies from 3.90 to 5.00 mm. The females average slightly smaller than the males. In some specimens the pronotum appears narrower than the elytra at the base, and the sides of the pronotum are not as arcuately rounded as in more typical specimens.

Holotype.—Aklavik, N.W.T. (Northwest Territories), July 28, 1932, Lot 308, collected by Owen Bryant (CAS).

Allotype.—60–75 mi. N of Rampart House, Alas. (Alaska), 23.6.12, J. M. Jessup (USNM).

Paratypes.—Total 21, 5 same data as for holotype (CAS). 10, Aklavik, N.W.T. (Northwest Territories), Aug. 13, 1932, Lot 319, collected by Owen Bryant (CAS). 4, Aklavik, N.W.T., Aug. 20, 1930, Lot 108 (CAS) (USNM). 2, Umiat, Alaska, 5-VI-47, collected by K. L. Knight (USNM).

Comparative notes.—This species does not resemble any other in the *niger-tenebrosus* group. As the groups are now defined it must fall here by virtue of the truncate metacoxal process, but it most resembles some members of the *pulcher-undulatus* group. Of the members of the *niger-tenebrosus* group it most nearly resembles *dentellus,* but it is distinguished by the obovate shape, coarse elytral punctures of the male, and the protarsal claws equal in length in the male.

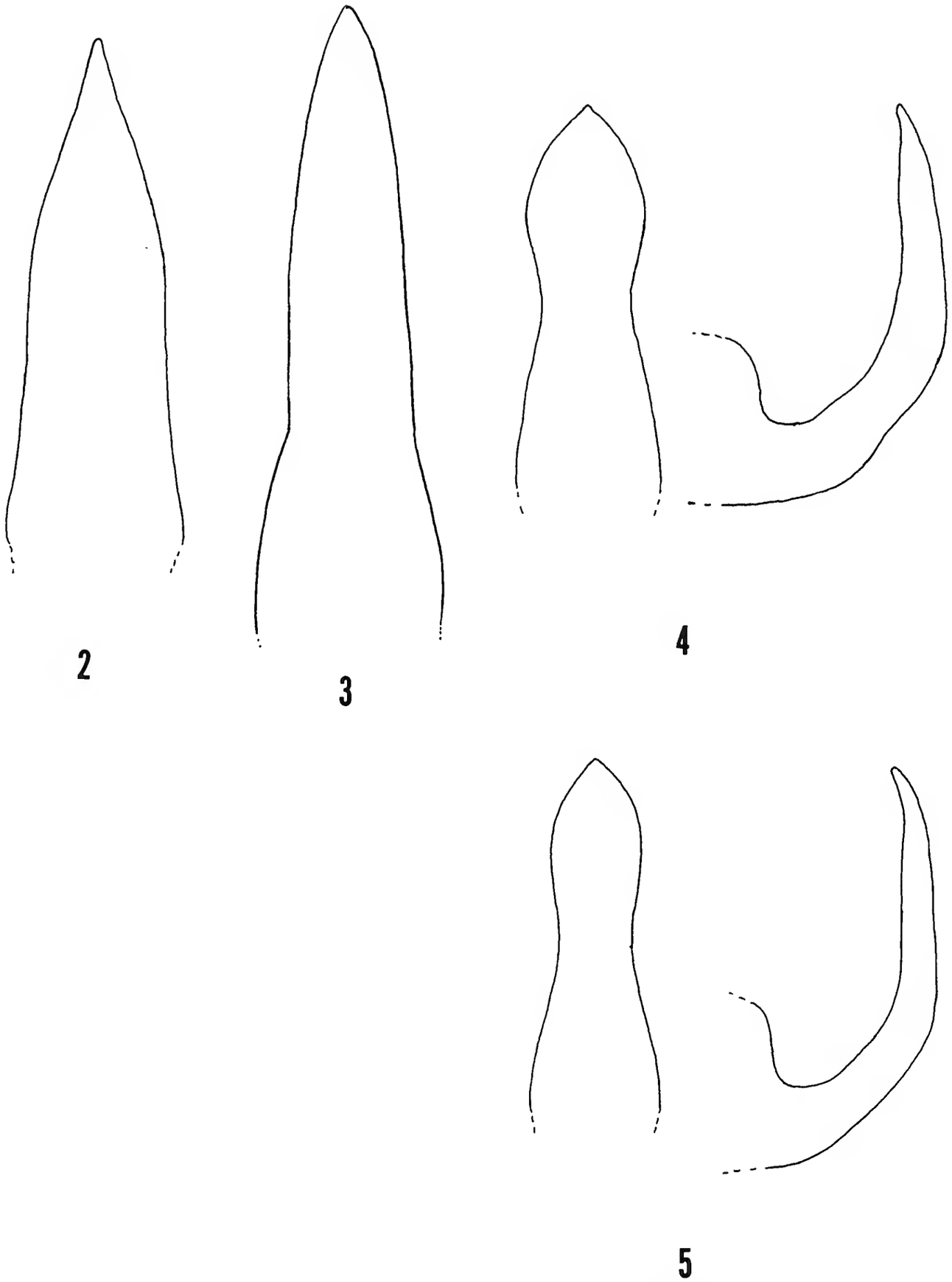
The specific name refers to the northern distribution of this species.

Hydroporus leechi, new species
(Fig. 3)

Holotype male.—Length 5.50 mm, width 2.90 mm. Form elongate-oval, widest at middle of elytra, sides nearly parallel in basal one-half of elytra. Head piceous with a narrow, rufous, basal border; palpus fuscous, apical segment piceous; undersurface of head reddish yellow; antennal segments dark brown apically, reddish yellow basally. Pronotum black, lateral border rufopiceous; legs, sides of abdominal sterna and apex of last abdominal sternum rufous.

Head alutaceous, punctures fine, separated by less than to 4 times their diameter.

Pronotum alutaceous; disc densely punctured, punctures separated by their diameter or slightly more, coarser marginal punctures contiguous or nearly so, forming longitudinal wrinkles near lateral margins; equal in width to base of elytra; hind angle abrupt, a right angle; lateral margin narrow, about the width of a protarsal claw; pubescence fine, sparse.



Figs. 2–5. Male genitalia of *Hydroporus* spp. Fig. 2, *H. boreus* (dorsal view). Fig. 3, *H. leechi* (dorsal view). Fig. 4, *H. signatus youngi* (dorsal, ventral views). Fig. 5, *H. signatus signatus* (dorsal, ventral views).

Elytron not as strongly alutaceous as pronotum, shining; punctures finer than on disc of pronotum, separated by their diameter or less; pubescence fine, longer and denser than on pronotum; lateral margin broadly ascending in basal one-third.

Metasternal wing and plate strongly alutaceous, indistinctly punctured; abdominal sterna coarsely and densely punctured, especially so laterally. Metacoxal process truncate at apex. Pro- and mesotarsi strongly dilated, slightly wider than tibia, second protarsal segment widest, rounded. Protarsal claw elongate, equal in length, not sinuate, slightly longer than last tarsal segment. Aedeagus long, slender, tapering to a point, side slightly sinuate (Fig. 3).

Allotype.—Female not known.

Variation.—The type series does not vary except for length 5.35–5.50 mm and width 2.80–2.90 mm.

Holotype.—San Mateo Co., California, Edgemar district of Pacifica, 4.6 mi. south of San Francisco Co. line; permanent pond E side Skyline Blvd., 9-X-1967, Hugh B. Leech (CAS).

Paratypes.—Total 3. 2, UNITED STATES: California: same data as for holotype (CAS) (USNM); 1, San Mateo Co., California, Skyline Pd., III-16-51, D. Rentz (CAS).

Comparative notes.—This species keys best to *columbianus* Fall in Fall's (1923) key to species. The male protarsal claw is as long or longer than the last protarsal segment, and the punctures of the metasternal wing nearly invisible in *leechi*. The male protarsal claw is ½ or less the length of the last protarsal segment, and the punctures of the metasternal wing are distinct in *columbianus*.

The specific name is in recognition of Hugh Leech's life-long contributions to water beetle systematics.

Hydroporus signatus youngi, new subspecies
(Figs. 4, 6)

Holotype male.—Length 4.15 mm, width 2.40 mm. Form oval, widest at middle of elytra. Head rufous with traces of two dark triangular spots between the eyes; palpus and undersurface of head rufous, last segment of maxillary palpus piceous apically; antenna piceous, first two segments testaceous. Pronotum piceous, rufopiceous laterally. Elytron piceous, humeral angle paler, traces of posterior marginal and subapical pale spot present. Undersurface black; legs rufous; third through fifth abdominal sterna rufous at sides, sixth sternum rufous at apex and sides.

Head alutaceous; punctures fine, separated by twice their diameter.

Pronotum alutaceous; punctures on disc separated by twice their diame-

ter, coarser marginal punctures nearly contiguous; equal in width to base of elytra; hind angle abrupt, slightly recurved; lateral margin moderate, one and a half times as wide as an anterior protarsal claw; pubescence fine, very sparse.

Elytron alutaceous, feebly shining; densely punctured, punctures slightly smaller than discal pronotal punctures, separated by their diameter; pubescence fine, denser on apical third; lateral margin straight from base to apex.

Metasternal wing and plate and first two abdominal sterna coarsely punctured. Metacoxal process truncate at apex. Pro- and mesotarsi moderately dilated, as wide as tibia, segments equal in width. Protarsal claws equal, both claws sharply bent at base, nearly parallel to tip, sinuate on inner margin, as long as last tarsal segment. Aedeagus slightly constricted at middle, anterior portion bulbous, apical projection very short (Fig. 4).

Allotype.—Length 3.80 mm, width 2.00 mm. Similar to holotype except dorsal surface dull, elytron strongly alutaceous and minutely punctate; pro- and mesotarsi not dilated, protarsal claw simple.

Variation.—Length varies from 3.90 to 4.20 mm in the male; 3.85 to 4.15 mm in the female. The markings on the elytra are more distinct in some individuals than in others. A series from Scott's Pond at Bloomington, Indiana, are lighter in color than normal and has elytral markings more distinct.

Holotype.—Beltsville, Maryland, 8-VII-1961, P. J. Spangler, USNM (72156).

Allotype.—Same data as for holotype (USNM).

Paratypes.—Total 219. UNITED STATES: ALABAMA: Mobile, VI-5-27, Darlington (MCZ); Mobile Co., Loding (MCZ); Novulicla?, VI-16-1931, H. P. Loding; Camp Rucker, Ozark, 31-XII-1942, J. G. Franclemont (FNY); Tumblin Gap (USNM), District of Columbia: Piney Branch, 2-5-05, DH Clemons collector (USNM): WASHINGTON, Coll. Hubbard and Schwarz (USNM). FLORIDA: Liberty County, 5.3 mi. S Bristol, VI-II-54, S Brown-F N Young (FNY). GEORGIA: Decatur County, Flatwoods, 2.7 mi. NE Faceville, VI-II-54, S Brown-F Young (FNY); Floyd County, Cave Spring, IX-4-49, F N Young (FNY); Fulton County, Fort McPherson in Atlanta, III-31-43, F N Young (FNY); Hart County, Nuberg, IX-I-1943 (FNY); Rabun Co., July (CAS). INDIANA: Brown Co., IV-21-56, J. R. Zimmerman (JRZ); Monroe Co., Bloomington, IV-26-56, V-11-56, V-12-56, V-17-56, V-22-56, VI-25-56, VII-1-56, VII-30-56, IX-8-56, X-5-56, X-11-56, XI-13-56, XII-3-56, X-11-55, X-18-55, J. R. Zimmerman (JRZ); Monroe Co., Hilltop Pond, I-29-50, F N Young (FNY); Monroe County, Scott's Pond at Bloomington, X-II-49, VII-2-50, II-24-51, IV-8-51, II-11-52, IV-17-52, V-3-52, VI-1-52, F N Young (FNY); Noble Co., X-26-56, J. R. Zimmerman (JRZ). MARYLAND: Beltsville, 8-VII-1961, P. J. Spangler (USNM); Beltsville,

Goldfish Pd., 9-V-1965, Robert Gordon (RDG); Friendship, 24-IV-1965, 8-V-1965, Robert Gordon (RDG); Garrett Co., Deep Creek L., 13-VI-1965, Robert Gordon (RDG); Marlboro, U. of Md. Tob. Fm., 25-V-1965, 29-VI-1965, Robert Gordon (RDG); C&O Lock at Plummer's Isl., VI-29-1960, VII-5-1960, IX-1-1960, P. J. Spangler (USNM); Potomac R., 16-V-1965, Robert Gordon (RDG); Rosehaven, 27-III-1965, 7-VIII-1965, Robert Gordon (RDG). MISSOURI: Ashland, V-8-1955, P. J. Spangler (USNM); Columbia, VIII-6-1953, P. J. Spangler (USNM); 5 mi. S Columbia, VIII-20-1953, M. C. Grabau (USNM); Maramec Spring, St. Hiway 8, VII-21-1958, P. J. Spangler (USNM). NEW JERSEY: Camden Co., VI-16-29, J. W. Green (CAS); Lakehurst, 9-1-01 (USNM); Lakehurst, V-2-27 (MCZ). NORTH CAROLINA: N.C. (MCZ); Raleigh, 9-March-02, F. Sherman Jr. (NCS); Raleigh, 29-April-03, C. S. Brimley (NCS); Swain Co., Bryson City, 8 mi. SW, V-18-57, J. R. Zimmerman (JRZ). OHIO: Athens Co., 15-VI-1960, 15-VII-1960, J. Stanley (OU); Armitage, Athens Co., VI-7-1951, P. J. Spangler (USNM); Athens Airport, Athens Co., 5-16-1950, 5-21-1951, 5-22-1951, 5-23-1951, VI-3-1951, Paul J. Spangler (USNM); Champaign Co., Cedar Run, July 24, 1964, J. L. Williams (USNM); 10-21-50, Jackson, Jackson Co., P. J. Spangler (USNM); 11-5-50, 5 mi. W of Chillicothe, Ross Co., P. J. Spangler (USNM). PENNSYLVANIA: Annville, Water Works, 6-VI-1965, Robert Gordon (RDG); Stony Creek, Lebanon Co., VI-22-1953, P. J. Spangler (USNM). SOUTH CAROLINA: Clemson College, IV-22-1928, 24 Nov. 1929, 12 Jun. 1930, 15 Mch. 1931, 24 Mch. 1931, D. Dunavan coll. (USNM); Rocky Bottom, Pickens Co., 14 May 1931, 20 Sept. 1931, D. Dunavan coll. (USNM); Walhalla, 24 Mch. 1929, D. Dunavan coll. (USNM); Windsor, 25 Nov. 1933, David Dunavan (USNM). TENNESSEE: Bluegrass, 31-X-40, G. Keener (CAS). VIRGINIA: Mt. Vernon, Fairfax Co., VIII-1-1919, E. Shoemaker collector (USNM); Fredskbg., 7-73, 9-93, 3-19-99, 3-30-99, 9-2-00 (USNM); Giles County, pond near Mt. Lake, VII-22-1959 (FNY); Ivy, June 1933, F. E. Winters (CAS); Beaver Pond Mt. Lake, 22-VIII-41, A. C. Cole (CAS); Warm Springs, 10-6 (USNM); Washington, 15-V-1965, Robert Gordon (RDG). WEST VIRGINIA: Swimming Pool, Droop Mt., June 9, 1933 (FNY); Smoke Hole, Pendleton Co., Aug. 7–30, J. G. Needham (FM) (CU); Ripley, 6-25-1930, P N Musgrave (FM) (CU).

Comparative notes.—A comparison of the male genitalia (Figs. 4, 5) is necessary to separate *youngi* from typical *signatus* Mannerheim (to which it will go in Fall's key 1923) with certainty, but the two can usually be distinguished when seen in series. *H. youngi* is larger and the punctures on the pronotal disc and elytra are much more dense, the metasternal plate is coarsely punctured and nearly equal to the metasternal wing in this respect, while nominate *signatus* has the punctures of the metasternal plate distinctly smaller than on the metasternal wing. Color differs considerably in typical

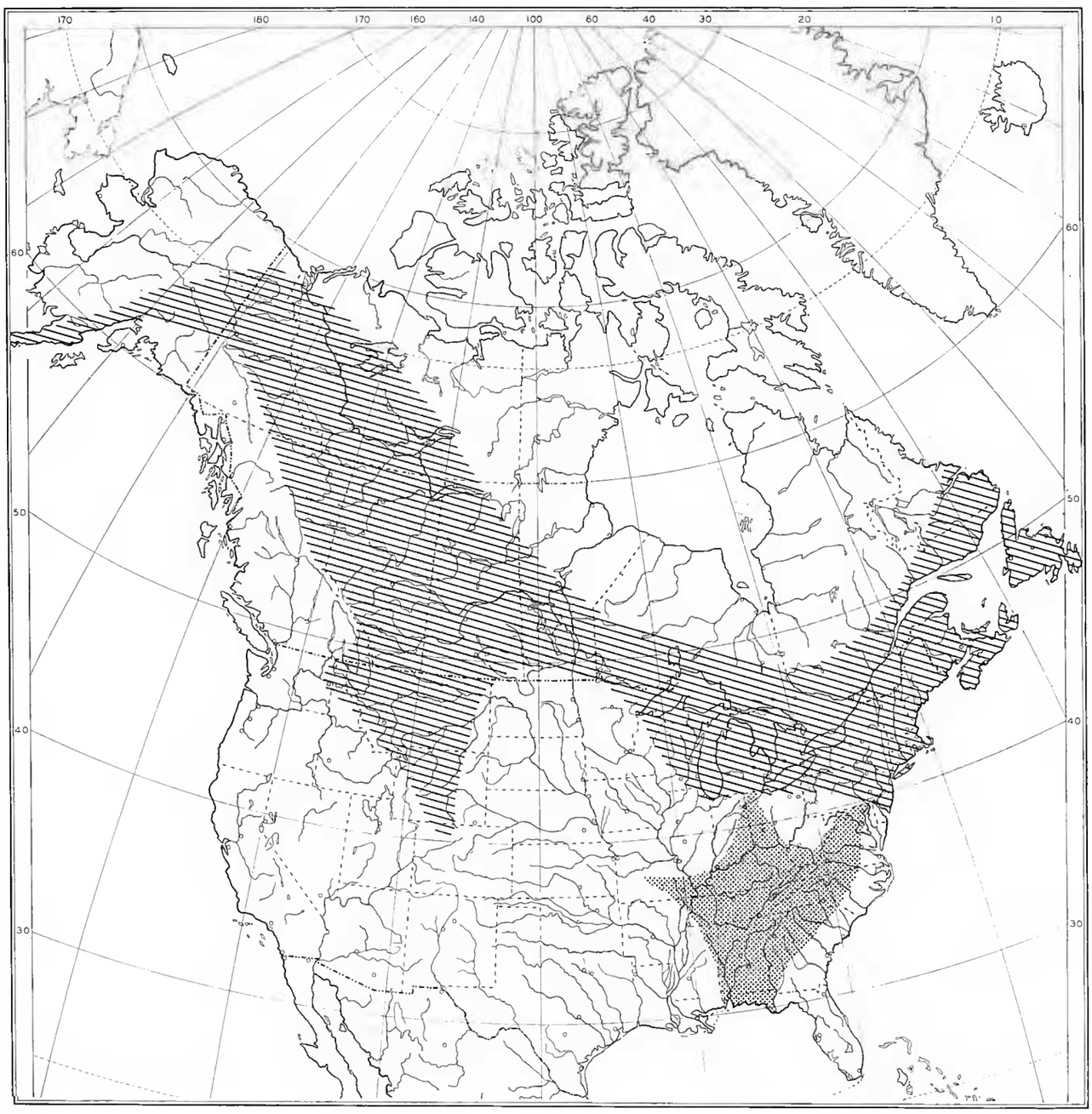


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Fig. 6. Distribution of *H. signatus signatus* (lined area) and *H. signatus youngi* (dotted area).

examples of the two subspecies. *H. signatus* has the head usually a uniform piceous, whereas *youngi* has either a plain rufous head or more typically with two dark triangular spots between the eyes. The elytron in *youngi* is much darker than *signatus* and the form is more regularly oval. The nominate form and *youngi* intergrade in New Jersey and Indiana (Fig. 6).

The specific epithet is a genitive of the surname of Frank Young, to whom I dedicate this subspecies in recognition of his contributions to water beetle taxonomy.

Hydroporus simplex, new species
(Fig. 7)

Holotype male.—Length 5.25 mm, width 2.80 mm. Form elongate oval, widest at middle of elytra. Head piceous with pale clypeal margin and pale posterior transverse band; palpus and entire undersurface of head rufous; antenna rufous; segments piceous in apical third. Pronotum black, paler laterally. Elytron brown. Undersurface black except abdomen rufous, legs rufous.

Head alutaceous; punctures fine, separated by one or two times their diameter.

Pronotum alutaceous; fine punctures on disc separated by twice their diameter, punctures becoming coarser laterally, nearly contiguous; equal in width to base of elytra; hind angle abrupt; lateral margin wide, two and one-half times as wide as an anterior protarsal claw; pubescence fine, sparse.

Elytron alutaceous, shining; finely and densely punctured, punctures equal in size to basal pronotal punctures, separated by less than their diameter; pubescence fine, sparse; lateral margin ascending in basal third.

Metasternal wing and plate and first two abdominal sterna coarsely punctured. Metacoxal process just perceptibly protruding at apex. Protarsus slightly dilated, much narrower than tibia, third segment narrower than first and second, parallel sided; mesotarsus not dilated. Protarsal claws unequal, anterior claw slightly shorter, thickened, claws half the length of the last tarsal segment. Aedeagus parallel sided, narrowing to a blunt point in apical fourth (Fig. 7).

Allotype.—Length 5.00 mm, width 2.80 mm. Similar to holotype except for the equal and unmodified protarsal claws.

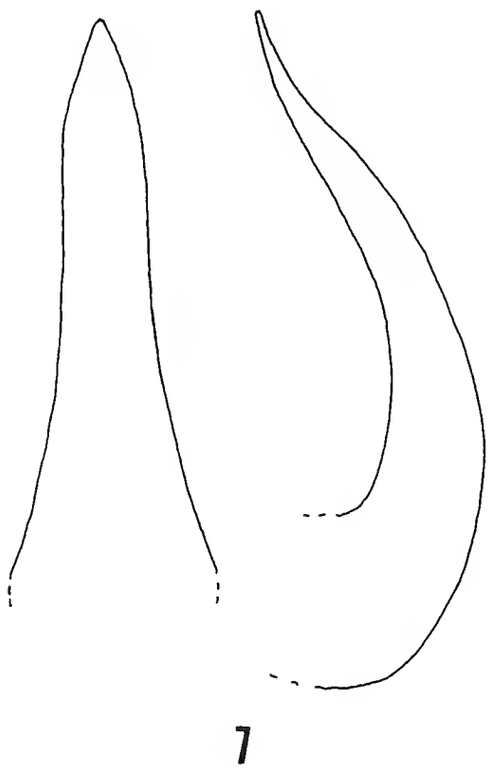
Variation.—No apparent variation is evident in the short type series. A single aberrant female has only two tarsal segments on the left protarsus with normal claws appearing on the second segment.

Holotype.—Pinecrest, Tuolumne Co. (California), 13-VII-1948, collected by P. H. Arnaud (CAS).

Allotype.—Same data as for holotype (CAS).

Paratypes.—Total 8. Same data as for holotype (CAS) (USNM).

Comparative notes.—Males of this species can be separated easily from males of other species in the same size range by the very narrow protarsus. It is closest to *subpubescens* LeConte and *columbianus* Fall, both of which have the protarsus as wide or wider than the tibia. Females can be separated from *columbianus* by size, which averages nearly 1 mm less than *columbianus*. Females of *subpubescens* are dull dorsally while females of *simplex* are as shiny as the male. If the rufous abdomen proves to be a constant character, it will easily separate this species from all other western members of the group. If this species is restricted to California and bordering states,



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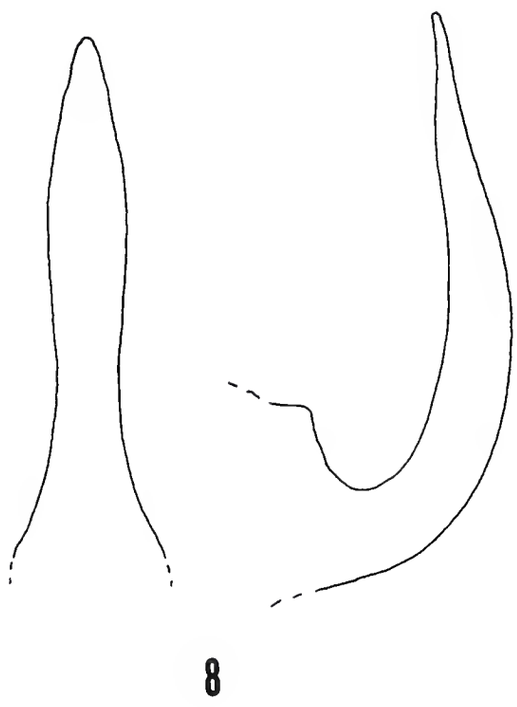

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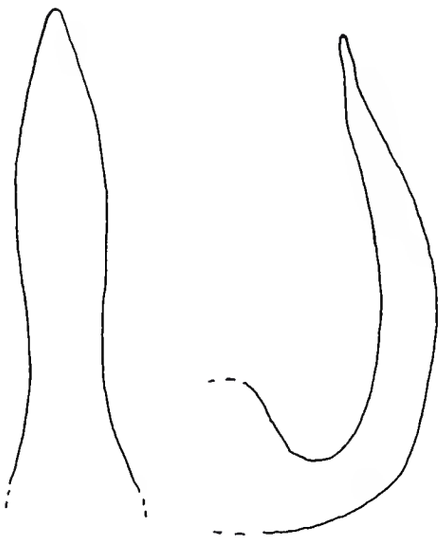

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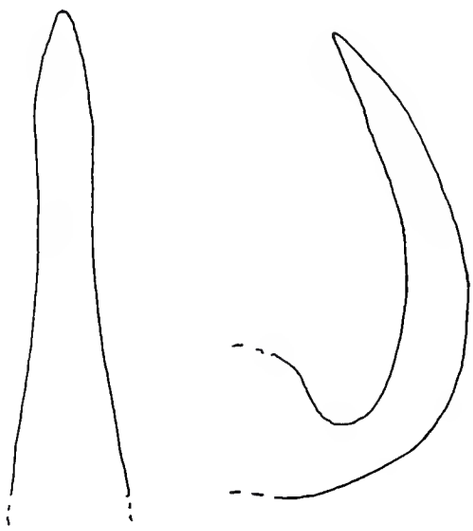

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Figs. 7–10. Male genitalia of *Hydroporus* spp. Fig. 7, *H. simplex* (dorsal, ventral views). Fig. 8, *H. utahensis* (dorsal, ventral views). Fig. 9, *H. hirsutus* (dorsal, ventral views). Fig. 10, *H. californicus* (dorsal, ventral views).

as may well be the case, *subpubescens* is the only species with which it may be confused.

The specific epithet refers to the lack of any outstanding morphological characteristic in this species.

Hydroporus utahensis, new species
(Fig. 8)

Holotype male.—Length 4.50 mm, width 2.50 mm. Form elongate-oval, widest at middle of elytra. Head rufopiceous with a pale posterior transverse band; gena black, rest of undersurface of head rufous; antenna rufopiceous, first two segments rufous. Pronotum rufopiceous becoming rufous laterally. Elytron slightly paler than pronotum. Undersurface black; legs rufous; faint rufous spot present on lateral margin of the third abdominal sternum.

Head alutaceous; punctures fine, separated by one and one-half times their diameter.

Pronotum alutaceous; fine punctures on disc separated by twice their diameter, coarser and nearly contiguous laterally and posteriorly; equal in width to base of elytra; hind angle abrupt; lateral margin wide, three to four times as wide as an anterior protarsal claw; pubescence fine, very sparse. Elytron alutaceous, shining; densely and evenly punctured, punctures smaller than basal punctures of pronotum, separated by their diameter; pubescence fine, sparse; lateral margin slightly ascending in basal third.

Metasternal wing and plate and first two abdominal sterna coarsely punctured. Metacoxal process slightly angulate at apex. Pro- and mesotarsi slightly dilated, narrower than tibia, segments one and two subequal in width, third segment slightly narrower. Protarsal claws equal, unmodified, half the length of last tarsal segment. Aedeagus long, slender, with a constriction in basal third, tapering gradually to a rounded tip (Fig. 8).

Allotype.—Length 4.35 mm, width 2.30 mm. Similar to holotype except dorsal surface slightly more alutaceous; punctures of elytron smaller, less distinct; pro- and mesotarsi not dilated; protarsal claw simple.

Variation.—One male in the type series is only 4.35 mm long, the rest are as for the holotype. The metacoxal process is flat in some specimens and perceptibly angulate in others. One male in the series is strongly alutaceous and dull in appearance.

Holotype.—Utah Lake East Side (Utah), No. 196 Exp., 7-6-41 NE, Elv. 4000 W, collected by H. P. Chandler (CAS).

Allotype.—Utah Lake East Side (Utah), No. 192 Exp., 7-6-41 NE, Elv. 4000 SW, collected by H. P. Chandler (CAS).

Paratypes.—Total 5. Same data as for holotype (CAS) (USNM).

Comparative notes.—This species resembles *despectus* Sharp and *hirtellus* LeConte. The broad constriction of the aedeagus in the basal third is a characteristic not shared by either *despectus* or *rusticus,* both of which have that portion of the aedeagus either not constricted, or with a feeble constriction occupying the basal two-thirds. The lateral margin of the pronotum is wider in *utahensis* than any of the related species. The punctures of the pronotum and elytra are fine in *utahensis,* much finer than those of

despectus, the gena is piceous or at least considerably darker than the submentum of *utahensis,* whereas the gena and submentum are the same color in *despectus*. The form of *utahensis* is more elongate than that of *hirtellus* and the elytral punctures, while nearly as fine as in *hirtellus,* are not nearly as dense. *H. similaris* Fall may also be confused with this species, but *similaris* males have the anterior protarsal claw distinctly shorter than the posterior.

The species name refers to the state in which the material was collected.

Hydroporus hirsutus, new species
(Fig. 9)

Holotype male.—Length 3.90 mm, width 1.90 mm. Form elongate, nearly parallel sided, widest at middle of elytra. Head piceous with clypeal margin and posterior transverse band rufous; last segment of maxillary palpus and gena piceous, rest of undersurface of head rufous; antenna rufopiceous, first two segments rufous. Pronotum piceous becoming rufopiceous laterally. Elytron brown. Undersurface black; legs rufous.

Head alutaceous; punctures moderately coarse, separated by one or one and one-half times their diameter.

Pronotum alutaceous; moderately coarse punctures on disc separated by twice their diameter, nearly contiguous posteriorly and laterally; equal in width to base of elytra; hind angle abrupt; lateral margin moderate, one and one-half times as wide as an anterior protarsal claw; pubescence fine, sparse.

Elytron slightly alutaceous, strongly shining; coarsely and evenly punctured, punctures larger than those on pronotum, separated by their diameter; pubescence fine, quite dense, particularly so laterally and posteriorly; lateral margin very slightly ascending in basal third.

Metasternal plate finely punctured; metasternal wing and first two abdominal sterna coarsely punctured. Metacoxal process angulate at apex. Pro- and mesotarsi narrowly dilated, not as wide as tibia, segments one and two equal, third segment smaller. Anterior protarsal claw slightly shorter than posterior, protarsal claw half the length of last tarsal segment. Aedeagus constricted in basal third, gradually narrowing to a blunt point in apical third (Fig. 9).

Allotype.—Length 4.00 mm, width 1.90 mm. Similar to holotype except alutaceous sculpture more evident on elytron; pro- and mesotarsi not dilated; protarsal claws equal in length.

Variation.—A few specimens in the series are slightly more alutaceous than the holotype. The degree of pubescence varies slightly but this is probably the result of handling the specimens.

Holotype.—Mt. Goethe, Fresno Co., Calif. (California), 9-VII-1952, 12,600 ft. elev., collected by Peter Raven (CAS).

Allotype.—Same data as for holotype (CAS).

Paratypes.—Total 14. Same data as for holotype (CAS) (USNM).

Comparative notes.—This species most nearly resembles *pervicinus* Fall and *californicus,* new species. It can be separated from *pervicinus* by the piceous last segment of the maxillary palpus and by the much finer punctation of the metasternal plate. The male protarsal claws are nearly equal, whereas in *pervicinus* the anterior protarsal claw is much shorter than the posterior. *H. hirsutus,* new species, can be separated from *californicus* by the narrow, elongate shape and much denser pubescence, both dorsally and ventrally.

The type series was taken at an altitude of 12,600 feet, and the species may possibly be restricted to high elevations. The specimens are unusually pubescent, in this respect resembling some of our small arctic species.

The specific epithet refers to the unusually distinctive pubescence.

Hydroporus californicus, new species
(Fig. 10)

Holotype male.—Length 3.85 mm, width 2.00 mm. Form oval, widest anteriad to middle of elytra. Head piceous with posterior transverse rufous band; gena and last segment of maxillary palpus piceous, rest of undersurface of head rufous; antenna piceous, first two segments rufous. Pronotum piceous becoming rufopiceous laterally. Elytron brown. Undersurface black, legs rufous.

Head alutaceous; punctures fine, separated by twice their diameter.

Pronotum alutaceous; moderately coarse punctures on disc separated by twice their diameter, coarser and nearly contiguous laterally and posteriorly; equal in width to base of elytra; hind angle abrupt, slightly recurved; lateral margin twice as wide as an anterior protarsal claw; pubescence fine, very sparse.

Elytron alutaceous, shining, evenly punctured, punctures larger than on pronotum, separated by their diameter; pubescence fine, very sparse; lateral margin ascending slightly in basal third.

Metasternal plate finely punctured; metasternal wing and first two abdominal sterna coarsely punctured. Metacoxal process slightly angulate at apex. Pro- and mesotarsi slightly dilated, narrower than tibia, segments one and two equal, third segment slightly narrower. Protarsal claws nearly equal in length, anterior claw just perceptibly shorter, claws half the length of last tarsal segment. Aedeagus narrow, feebly constricted medially, enlarged apically before tapering to a blunt point (Fig. 10).

Allotype.—Length 3.8 mm, width 2.00 mm. Identical to holotype in all respects except that the pro- and mesotarsi are not dilated.

Variation.—The degree to which the metacoxal process is produced varies from just perceptibly angulate to definitely so.

Holotype.—Mono Co., Cal. (California), round pond on ridge S of Leavitt Mdw., 13-VII-1963, collected by H. B. Leech (CAS).

Allotype.—Same data as for holotype (CAS).

Paratypes.—Total 22, 21, same data as for holotype; 1, California, Mendocino Co. Univ. Cal. Range Exp. Sta., pond by deerpen, about 4 mi. NE of Hopland, 30-VI-1963, collected by H. B. Leech (CAS) (USNM).

Comparative notes.—This species is closest to *hirtellus* LeConte in appearance. In series it averages obviously smaller than *hirtellus*. The elytral punctures are coarser and not as dense. The punctation of the metacoxal plate in *hirtellus* is coarse, not appreciably different than the punctures of the metasternal wing and first two abdominal sterna. In *californicus* the punctation of the metacoxal plate is fine, much finer than metasternal wing or first two abdominal sterna. *H. californicus* may also be confused with *hirsutus,* new species, but see comparative notes under *hirsutus*.

The species name refers to the state in which the type material was collected.

Hydroporus fatigus, new species
(Fig. 11)

Holotype male.—Length 4.25 mm, width 2.25 mm. Form elongate oval, widest at middle of elytra. Head rufopiceous with pale posterior transverse band; palpus rufous, terminal segments darker; undersurface of head rufous with gena darker; antenna rufopiceous, first two segments rufous. Pronotum piceous, becoming paler laterally. Elytron brownish piceous, humeral angle paler; undersurface black; legs rufous with femora darker medially. Third and fourth abdominal sterna rufous laterally.

Head alutaceous; punctures fine, separated by twice their diameter.

Pronotum alutaceous; fine punctures on disc separated by two or three times their diameter, punctures slightly larger at margins, separated by their diameter; equal in width to base of elytra; hind angle abrupt; lateral margin wide, twice as wide as an anterior protarsal claw; pubescence fine, sparse.

Elytron alutaceous, shining; moderately coarsely punctured throughout, punctures slightly larger than basal pronotal punctures, separated by their diameter; pubescence fine, sparse; lateral margins slightly ascending in basal third.

Metasternal wing and plate and first two abdominal sterna coarsely punctured. Metacoxal process strongly angulate at apex. Protarsus slightly di-

lated, narrower than tibia, segments equal in width; mesotarsus not dilated. Protarsal claws equal, anterior claw slightly thickened, claws less than half the length of last tarsal segment. Aedeagus narrow, pinched at basal third, narrowing to a blunt point apically (Fig. 11).

Allotype.—Length 4.20 mm, width 2.00 mm. Similar to holotype in all respects except that the color of the abdomen is entirely rufous; protarsus not dilated, protarsal claws simple.

Variation.—Size ranges from 3.90 to 4.30 mm in length, 1.90 to 2.10 mm in width. The rufous abdomen of the allotype female is not constant for all specimens. The color of the abdomen varies from rufous to black. An occasional specimen lacks the distinctive pale humeral angle.

Holotype.—Abbotsford, B.C. (British Columbia), roadside ditch, 14-IX-45, collected by Hugh B. Leech (CAS).

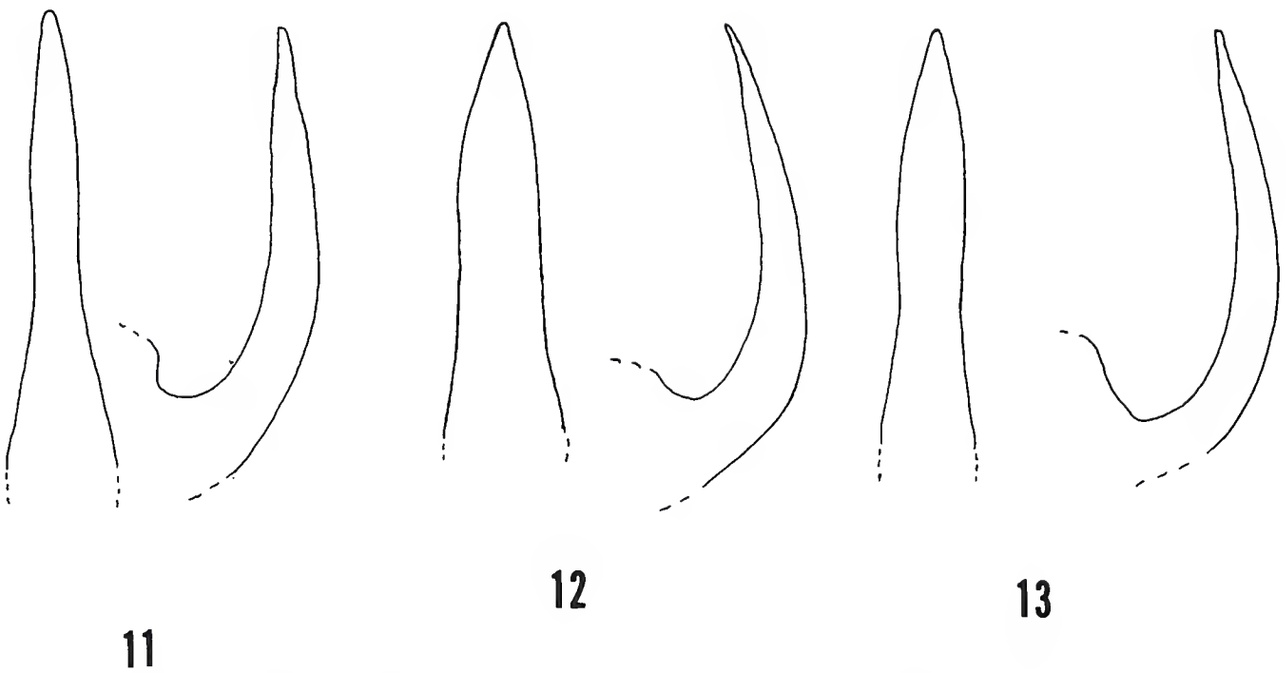
Allotype.—Abbotsford, B.C., 29-V-40, collected by H. B. Leech (CAS).

Paratypes.—Total 67. CANADA: BRITISH COLUMBIA: Abbotsford, 29-V-40, 14-IX-45, H. B. Leech (CAS); Salmon River, Glenemma, 15-VII-49, H. B. Leech collector (CAS); Fraz. Val., J. D. Sherman collection (USNM); Lac-le-Jeune, Kamloops, 23-V-1933, A. C. Thrupp (CAS); Tranquille Lake, near Kamloops, 27-VIII-1939, G. J. Spencer (CAS); Langley, 26-I-1935, 17-IV-35, 23-VI-35, K. Graham (CAS); Lumby, 19-IX-1937, 16-IX-1939, 25-II-1943, 25-IX-1943, 8-IX-1944, H. B. Leech (CAS); Metlakatla, Rev. Keene collection (USNM); Salmon Arm, 22-VIII-1929, 2-IX-1929, 7-X-33, 5-IX-37, Hugh B. Leech (CAS); Vancouver, 29-III-30, VI-11-30, 5-IX-1932, Hugh B. Leech (CAS); Wynndel, 25-VII-47, G. S. Smith (CAS).

UNITED STATES: MONTANA: 2 mi. W Corvallis, Ravalli Co., V-20-1952, A. A. Hubert. OREGON: Corvallis, J. D. Sherman collection (USNM); Corvallis, 20-V-1938, Hugh B. Leech (CAS); Crescent, Klamath Co., 10-IX-1950, Malkin & Thatcher (FM); Ft. Klamath, Klamath Co., 13-VIII-1950 (FM); Curry Co., VI-12-1954, R. K. Benjamin (USNM). WASHINGTON: Chase Lake, 25-VII-1954, B. Malkin (FM); Mason Co., Cushman, VI-22-1919, F M Gaige (FNY); Shohomish R., 5-23-92 (USNM).

Comparative notes.—This species is grouped with *similaris* Fall and *longiusculus* Gemminger and Harold by the strongly angulate apex of the metacoxal process. *H. longiusculus* is slightly smaller, flattened dorsoventrally, and has the elytral punctures much finer than *fatigus*. The elytra of *longiusculus* are yellowish brown while the elytra of *fatigus* are usually nearly piceous. *H. similaris* males can immediately be separated from *fatigus* males by the short anterior protarsal claw. The females are difficult to separate, but *fatigus* characteristically has a distinct pale yellowish humeral angle which *similaris* lacks.

The specific epithet refers to the amount of effort "fatigue" expended before this species was finally segregated from *similaris*.



Figs. 11–13. Male genitalia of *Hydroporus* spp. Fig. 11, *H. fatigus* (dorsal, ventral views). Fig. 12, *H. elusivus* (dorsal, ventral views). Fig. 13, *H. spangleri* (dorsal, ventral views).

Hydroporus elusivus, new species
(Fig. 12)

Holotype male.—Length 3.40 mm, width 1.80 mm. Form elongate oval, widest anterior to middle of elytra. Head rufopiceous, slightly paler on clypeal margin; palpus and entire undersurface of head rufous; antenna rufopiceous, first two segments rufous. Pronotum rufopiceous becoming paler laterally. Elytron brown. Undersurface rufopiceous; legs rufous; third through sixth abdominal sterna rufous laterally.

Head alutaceous; punctures fine, separated by twice their diameter.

Pronotum alutaceous; fine punctures on disc widely separated, punctures becoming coarser laterally, separated by less than their diameter; equal in width to base of elytra; hind angle abrupt; lateral margin wide, three times as wide as an anterior protarsal claw; pubescence fine, very sparse.

Elytron alutaceous, shining; coarsely punctured, punctures subequal in size to basal pronotal punctures, separated by slightly less than their diameter; pubescence fine, very sparse; lateral margin slightly ascending in basal third.

Metasternal wing and plate and first two abdominal sterna coarsely punctured. Metacoxal process truncate at apex. Pro- and mesotarsi slightly dilated, almost as in female, narrower than tibia, segments equal in width. Protarsal claws equal, anterior claw slightly thickened, claws half the length of last tarsal segment. Aedeagus tapering from base to apex, ending in a blunt point (Fig. 12).

Allotype.—Length 3.60 mm, width 1.90 mm. Similar to holotype except dorsal surface more alutaceous. Pro- and mesotarsi slightly narrower than male, protarsal claws simple.

Variation.—No apparent variation is evident in the short type series.

Holotype.—Rumney, N.H. (New Hampshire), IV-22-1926, collected by P. J. Darlington (MCZ).

Allotype.—Same data as for holotype (MCZ).

Paratypes.—Total 2. Same data as for holotype (MCZ) (USNM).

Comparative notes.—This species most nearly resembles *tartaricus* LeConte from which it may be separated by the spacing of the elytral punctures. The punctures are much closer together in *elusivus,* and the male protarsus is much narrower than in *tartaricus*. The specific epithet refers to the apparent scarcity of this species which I have seen from a single locality.

Hydroporus spangleri, new species
(Fig. 13)

Holotype male.—Length 3.40 mm, width 1.80 mm. Form obovate, widest posterior to middle of elytra. Head piceous with a pale posterior transverse band; palpus and entire undersurface of head rufous; antenna rufopiceous, first two segments rufous. Pronotum piceous becoming paler laterally. Elytron brown. Undersurface black; legs rufous; third abdominal sternum with rufous spot laterally.

Head alutaceous; punctures fine, separated by one or two times their diameter.

Pronotum alutaceous; fine punctures on disc unevenly spaced, punctures becoming coarser laterally, separated by less than their diameter; equal in width to base of elytra; hind angle slightly rounded; lateral margin narrow, less than twice as wide as an anterior protarsal claw; pubescence fine, very sparse.

Elytron alutaceous, shining; coarsely and evenly punctured, punctures equal in size to basal pronotal punctures, separated by less than their diameter; pubescence fine, sparse on disc, becoming more dense laterally and posteriorly; lateral margin slightly ascending in basal third.

Metasternal wing and plate and first two abdominal sterna coarsely punctured. Metacoxal process angulate at apex. Pro- and mesotarsi slightly dilated, narrower than tibia, segments two and three equal in width, third segment narrower. Protarsal claws equal, unmodified, claws half the length of last tarsal segment. Aedeagus with sides nearly parallel, tapering to a point in apical third (Fig. 13).

Variation.—The two males in the type series show no apparent variation.

Holotype.—Lambs Canyon nr. S (Salt) Lake City (Utah), VI-30-1949, collected by G. K. Todd (USNM 72155).

Allotype.—No female available for study.

Paratype.—Total 1. Same data as for holotype (USNM).

Comparative notes.—*H. spangleri* most nearly resembles *occidentalis* to which it keys in Fall (1923). The elytron is much more coarsely and densely punctate than *occidentalis,* and the male genitalia of *spangleri* have the aedeagus very slender and obviously constricted medially, while the aedeagus of *occidentalis* is comparatively broader and not constricted, or if constricted, then feebly and broadly so. The holotype and a single paratype are the only specimens seen to date. The specific epithet is a genitive of the surname of Paul Spangler, to whom I am indebted for much help and encouragement in studies of water beetles.

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Footnote

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